IN THE SPECIFICATION:

Please replace paragraph [0032] with the following amended paragraph:

[0032] The position of the robot 132 allows the robot 132 to access substrate cassettes positions on loading stations ~~134~~ 130, and to then deliver the substrates to one of the processing cell stations shown at 114 and 116 positioned on the mainframe 113. Similarly, the robot 132 may be used to retrieve substrates from the processing cells 114, 116, or transfer substrates to or from an annealing chamber, shown at 135. After a substrate processing sequence is complete, the robot 132 returns the substrates back to one of the cassettes for removal from the ECP system 100. Additional configurations and implementations of an electrochemical processing system are illustrated in commonly assigned United States Patent Application Serial No. 10/435,121 filed on December 19, 2002 entitled "Multi-Chemistry Electrochemical Processing System", which is incorporated herein by reference in its entirety.

Please replace paragraph [0038] with the following amended paragraph:

[0038] Figure 3A illustrates a partial perspective and sectional view of an exemplary substrate spin rinse dry cell 300 of the invention. The spin rinse dry cell 300 (SRD) includes a fluid bowl/body 301 supported on a frame that may be attached to a plating system, such as the mainframe 113 illustrated in Figure 1. The SRD 300 further includes a rotatable flywheel 302 and a central hub 320 centrally positioned in the fluid bowl 301. The ~~flywheel 302~~ central hub 320 may include a generally planar or curved upper surface that has a plurality of backside fluid dispensing nozzles 308 formed thereon and at least one gas dispensing nozzle 310 formed thereon (also shown in Figure 5 as nozzles 503). These nozzles 308, 310 permit fluid, *e.g.*, deionized water, and gas, *e.g.*, N_2 purge gas, to be applied to the back side of a substrate 304. In one embodiment of the invention, flywheel 302 is covered by a horizontal shield 330 on an upper surface thereof, and by a vertical shield 331 on a side or vertical surface thereof. Both shields 330, 331 are positioned to be stationary and adjacent to the flywheel 302.

More particularly, horizontal shield 330 may be attached to the central hub ~~520~~ 320 ~~(illustrated in Figure 5)~~ and extend radially outward therefrom. Further, shield 330 may be positioned to essentially float above the rotating flywheel 302 with a space between the rotating flywheel 302 and the shield 330 being between about 1mm and about 5mm, for example. Similarly, vertical shield 331 may be attached to basin shield member 312 and be positioned to be spaced from a vertical edge of the flywheel 302 by a distance of between about 1mm and about 5mm, for example. The positioning of shields 330, 331 is generally configured to minimize the exposed rotating surface area of flywheel 302. More particularly, the exposed surface area 332 of flywheel 302 is a cause of turbulent airflow in cell 300. Since turbulent airflow does not facilitate effective drying of substrates, minimization of turbulent airflow is desired. Thus, in one embodiment of the invention, the exposed rotating surface area of the flywheel ~~332~~ 302 is minimized in order to minimize induced turbulence in the airflow within the cell 300.

Please replace paragraph [0040] with the following amended paragraph:

[0040] The upper portion of SRD 300 may include a lid member 305, which is generally dome shaped, that operates to enclose a processing space below the dome 305 and above the flywheel 302. Further, dome member 305 includes at least one gas nozzle 307 positioned therein that is configured to dispense a processing gas into the processing space, and a fluid manifold 306 configured to dispense a processing fluid therefrom onto the substrate 304 secured to the fingers 303. At least one side of the SRD 300 includes a door or opening (not shown) that may be selectively opened and closed to provide access to the processing area of SRD 300. The lower portion of SRD 300 includes an annular basin shield member 312 positioned around the perimeter of the basin. The shield 312 is positioned below and radially outward of the flywheel 302, and therefore, is configured to shed fluid outwardly to the perimeter of the basin. Additionally, shield 312 is configured to be vertically actuatable by a vertical actuator 311, as will be further discussed herein.

Please replace paragraph [0043] with the following amended paragraph:

[0043] Figure 3C illustrates another embodiment of an SRD cell 300. However, cell 300 illustrated in Figure 3C includes circulation breaker fins ~~794~~ 790, which will be further discussed herein with respect to Figures 7 and 8. The fins ~~794~~ 790 operate in the same manner in the cell 300 illustrated in Figure 3C as described with respect to Figures 7 and 8, *i.e.*, to reduce the cyclonic effect between the substrate 304 and the flywheel 302 near the center, which minimizes redeposition of fluids onto the substrate as a result of the cyclonic effect during rotation dry steps.

Please replace paragraph [0048] with the following amended paragraph:

[0048] The process of actuating the finger members 303 generally includes mechanically engaging and vertically moving the lower actuator portion 408. For example, vertical or upward movement of the lower actuator portion 408 causes the finger 303 to pivot outward to expose the substrate support post 401. The lower actuator portion 408 is vertically actuated via the vertical ~~actuation~~ actuator 311 of the shield member 312, which is positioned to mechanically engage the lower actuator portion 408. Thus, when the substrate is being loaded onto the substrate support assembly 400, shield 312 is raised to open the fingers 303 to a substrate receiving/loading position. Once the substrate is loaded, then shield 312 may be lowered and the substrate engaged by notches 406 for the rinsing and drying process. The unloading process may be conducted in substantially the same manner.

Please replace paragraph [0049] with the following amended paragraph:

[0049] Figure 5 illustrates a partial and enlarged sectional view of a hub 520. The hub 520 resides within the central opening of the rotatable flywheel 302 of Figure 2. The interior portion of hub 520 includes a conduit 501 configured to communicate a rinsing fluid to a plurality of fluid dispensing apertures 503 formed onto the upper surface 504 of the hub 520 via a fluid dispensing manifold 502. Additionally, hub 520 generally includes a second conduit (not shown) formed therein that is configured to

communicate a drying gas to a plurality of gas dispensing purge ports ~~504~~ <u>505</u>. Further, embodiments of the invention contemplate that the fluid and gas conduits may be combined into a single conduit, wherein a valve assembly is used to switch between fluid and gas supplied to the single conduit. <u>A flywheel 521 is connected to a motor cover 522 and a motor 523 via screws 524.</u>

Please replace paragraph [0057] with the following amended paragraph:

[0057] However, one phenomenon that has been observed in spin rinse dry-type cells is that the rotation of the substrate at speeds in excess of 500 rpm has been shown to generate a region of reduced pressure under the substrate and proximate the center of the rotating substrate. Further, when a drying gas is introduced into the region below the substrate, by nozzle 732, for example, the introduction of the gas initiates a cyclonic effect in the airflow near the center of the substrate within the reduced pressure region. This cyclonic effect generates an inwardly and upwardly directed airflow pattern, *i.e.*, air flows toward the center of the hub 730 along the surface thereof and is urged upward near the center of hub 730 toward the substrate. This inwardly and upwardly directed airflow has been shown to carry droplets of processing fluid that are residing on the hub ~~520~~ <u>730</u> or flywheel surface ~~602~~ <u>741</u> inward and upward, and as such, cause these fluids to redeposit on the substrate being dried. This redepositing of processing fluid onto the backside of the substrate during the drying process is addressed by the embodiment of the invention illustrated in Figures 7 and 8 via implementation of circulation breaker bars, which will be further discussed herein.

Please replace paragraph [0064] with the following amended paragraph:

[0064] At the center of the flywheel 740 within its inner diameter 744 is a hub 730. The hub 730 is preferably stationary, meaning that it does not rotate relative to the flywheel 740. The hub 730 is supported by a shaft below the hub 730. The shaft typically extends below the cell body 710. The shaft is not shown in the perspective view of Figure 6, but may be configured in accordance with shaft 320 in Figure 3. The

shaft typically receives and supports fluid channel members (not shown) that transport liquid and gas materials. These channels empty into the surface of the hub ~~630~~ 730 as nozzles 732, 734. Nozzle 732 is provided proximate to the center of the hub 730, and generally serves as a gas nozzle. The gas nozzle 732 supplies a purge gas, such as nitrogen, helium, argon or other inert gas, during the drying operation. In addition, one or more fluid nozzles 734 are provided. In the exemplary arrangement of Figure 7, the fluid nozzles 734 are dispensed in a fluid delivery arm 735 that extends outward from the hub 730. Fluid streams are dispensed through a port proximate to the center of substrate 750, and at two other locations increasingly away from the substrate center to provide satisfactory cleaning coverage. The fluid nozzles 734 dispense rinsing fluid, such as deionized water (H_2O_2), or chemicals (e.g., H_2SO_4) for the rinsing process.

Please replace paragraph [0066] with the following amended paragraph:

[0066] Finally, Figure 7 shows that the SRD cell 700 includes one or more novel flow circulation control/breaker fins 790. In the embodiment shown in Figure 7, the fins 790 each have a proximal end 792 connected to the hub ~~640~~ 730. Connection is preferably by means of chemical bonding or heat-induced adhesion. The fins 790 also each have a distal end 794 that extends towards the outer diameter 742 of the flywheel 740. It is preferred that two fins 790 be employed, and that the fins 790 be placed on diametrically opposite sides of the hub 730, as shown in Figure 7. It is also preferable that the fins 790 be linearly configured in their respective radial directions. However, variations from these design preferences are tolerated.

Please replace paragraph [0069] with the following amended paragraph:

[0069] Laboratory studies have revealed that the placement of at least one fin 790, or "circulation breaker," inhibits the cyclonic airflow (specifically the inwardly directed cyclonic airflow) and increases the pressure near the center of the hub ~~630~~ 730. Further, the fin 790 also operates to shift the low pressure region from the center of the substrate to the area immediately behind the fin 790, which does not cause

inwardly traveling airflow. The at least one fin 790 generally has a rotational speed that is lower than the rotational speed of the substrate 750. Preferably, the at least one fin 790 is stationary. The presence of at least one fin 790 serves to block the back flow of mist during a high speed spin operation by dampening the cyclonic effect. When the fins 790 are connected to the hub ~~630~~ <u>730</u>, the fins ~~690~~ <u>790</u> aid in evenly distributing pressure below the substrate 750.

Please replace paragraph [0072] with the following amended paragraph:

[0072] An additional novel feature that is incorporated into the improved SRD cell 700 of the present invention is a substrate sensing system ~~810~~ <u>855</u>. The components of the substrate sensing system ~~810~~ <u>855</u> are seen in the side view of Figure 8. Figure 8 presents a partial cross-sectional side view of an SRD cell 800 in an alternate arrangement. The SRD cell 800 is generally configured in accordance with the SRD cell 700 described above, however, a substrate 850 has been placed in the cell 800 for processing. In addition, ~~a~~ <u>the</u> substrate sensing system 855 is incorporated.

Please replace paragraph [0073] with the following amended paragraph:

[0073] Referring to Figure 8, the SRD cell 800 includes a number of components previously described in connection with Figure 7, including a cell body 810, a shield 808, shield supporting brackets 815, a flywheel 840, ~~a hub 830,~~ substrate support fingers 820, fins 830, and a purge gas nozzle 832. In addition, the SRD cell 800 includes a fluid shaft ~~890~~ <u>839</u> with a plurality of fluid dispensing nozzles thereon (not shown). In one arrangement, the shield 808 is mounted on two pneumatic actuators with flexible connecting brackets and moves down into the chamber bowl cavity (not shown) during substrate transfer, thus preventing any liquid from dripping outside of the SRD cell 700. A fluid shaft 839 serves to house fluid and gas conduits for the cell 800. A shield 808 is simply a protective guard against a substrate that might become dislodged during a high speed spinning process.